DATE	REVISION	BY

IT Modernization:
EA Information Management

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1.0 Introduction

It is the policy of the United States Government that executive agencies shall significantly improve the management of their information systems, including the acquisition of information technology, by implementing the relevant provisions of the Paperwork Reduction Act of 1995 (Public Law 104-13), the Information Technology Management Reform Act (ITMRA) of 1996 (Division E of Public Law 104-106), and the Government Performance and Results Act (GPRA) of 1993 (Public Law 103-62). OMB Circular A-130 (November 2000) issued under the authority of the ITMRA, Paperwork Reduction Act, GPRA and other legislation establishes policy for the management of Federal information resources of all agencies of the executive branch of the Federal government. It specifically orders that agencies must document and submit enterprise architecture (EA) to the Office of Management and Budget (OMB).

OMB Circular A-130 states that enterprise architecture is the explicit description and documentation of current and desired (target) relationships among business and management processes and information technology. EA also provides a strategy that will enable an agency to support its current IT environment and act as a roadmap for the transition to approved target architecture. Transition processes include EA planning, an agency's capital planning and investment control (CPIC) process, and system life cycle methodologies.

To support the transition to an agency's target architecture, OMB Circular A-11 added enterprise architecture to the business case (Part III, OMB Exhibit 300) for agency IT investments. OMB Guidance requires agencies to explain how each IT investment supports, modernizes or conforms to the agency's enterprise architecture and the Federal Enterprise Architecture Framework.

Enterprise Architecture Legislation and Guidance:

1. Clinger Cohen Act of 1996 Division E: Information Technology Management Reform (1996) - also known as the *Information Technology Management Reform Act (ITMRA 1996)*.
2. Executive Order 13011 of July 16, 1996
3. Government Performance and Results Act of 1993.
4. OMB Circular A-11 (July 2001)
5. OMB Circular A-130 (Transmittal Memorandum 4, November 2000)

1.1 Information Technology Lifecycle

To meet legislative requirements, the United States Department of Housing and Urban Development (HUD) Office of the Chief Information Officer (OCIO) has developed an enhanced Information Technology Lifecycle. The lifecycle is comprised of three phases - architecture, investment and implementation – and promotes a high level of integration between the Department's Enterprise Architecture (EA) practice, IT Investment Management (ITIM) process, and system implementation processes including HUD's System Development Methodology (SDM) and project management guidelines.

The lifecycle mandates that the development of information technology architecture is a pre-requisite for the preparation and submission of IT investment initiatives. To be considered to receive funding for IT initiatives, Program Offices must prepare segment architecture for an individual line of business and/or core service, and submit an information technology blueprint for reconciliation with HUD's enterprise-wide architecture.

1.2 About this Document

This document provides an architectural blueprint (segment architecture) for enterprise architecture information management. EA information management seeks to develop, review, approve and publish EA work products in support of HUD's integrated IT lifecycle.

The segment architecture components described in this document will contribute to the preparation of ITIM initiative documentation for HUD's enterprise architecture practice including the definition of individual projects to:

- support EA information management requirements through the development of work processes and/or information system components
- integrate an EA knowledgebase with existing work processes and information system components that support IT investment and implementation

This document includes the recommended components of a segment architecture blueprint and serves as a working prototype for the preparation of segment architecture work products. The table below describes the required elements of a segment architecture blueprint.

Component	Content
Business Profile	• Documents business process analysis including a concept of operations (CONOPS), target workflow, and information value-chain • Maps business processes to HUD's Business Reference Model (BRM) and the Federal BRM • Documents implementation alternatives and associated risk
System Profile	• Maps business and information requirements to the future state technical architecture (FSTA)
Architectural Profile	• Defines automation targets and integration targets (by organization)
Implementation Plan	• Defines performance measures • Describes major program implementation projects, dependencies, and schedule

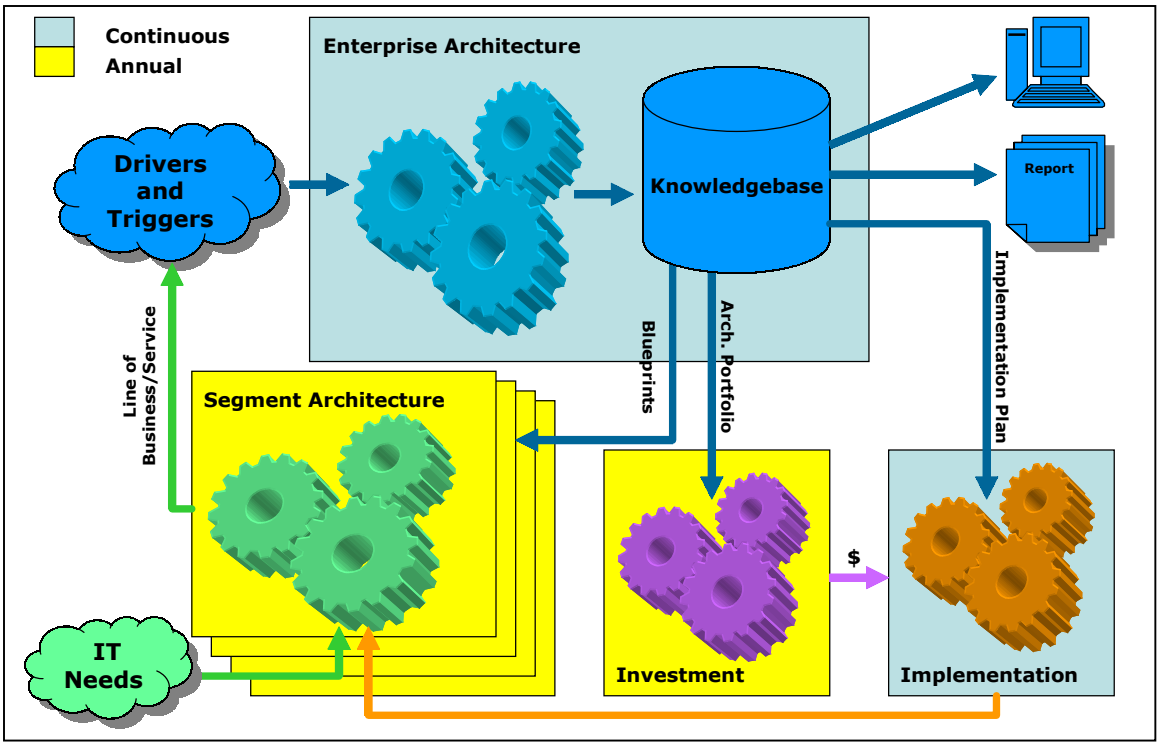
2.0 Business Profile

Business Process Analysis

Concept of Operations (CONOPS)

Development and implementation of target architecture begins with the definition of the Concept of Operations (CONOPS). This diagram helps to define the future business environment and to identify strategic changes in current business operations.

The diagram below illustrates HUD's enhanced IT lifecycle. The EA phase responds to a series of inputs (drivers and triggers) to create, update and publish EA work products - drivers and triggers include strategic business goals, information technology drivers, government and industry best practice, and business and information requirements (segment architecture). Enterprise architecture drives IT investments and system implementation projects to deliver IT services in support of the Department's individual lines of business. An EA knowledgebase provides convenient, enterprise-wide access to EA work products and related information, and supports all phases of the IT lifecycle.



The enhanced IT lifecycle is a closed-loop process. Segment architecture is updated annually to reflect program goals and objectives, and system implementation requirements. The EA phase reconciles segment architecture with other drivers to

update HUD's target enterprise architecture, drive IT investments, and support system implementation.

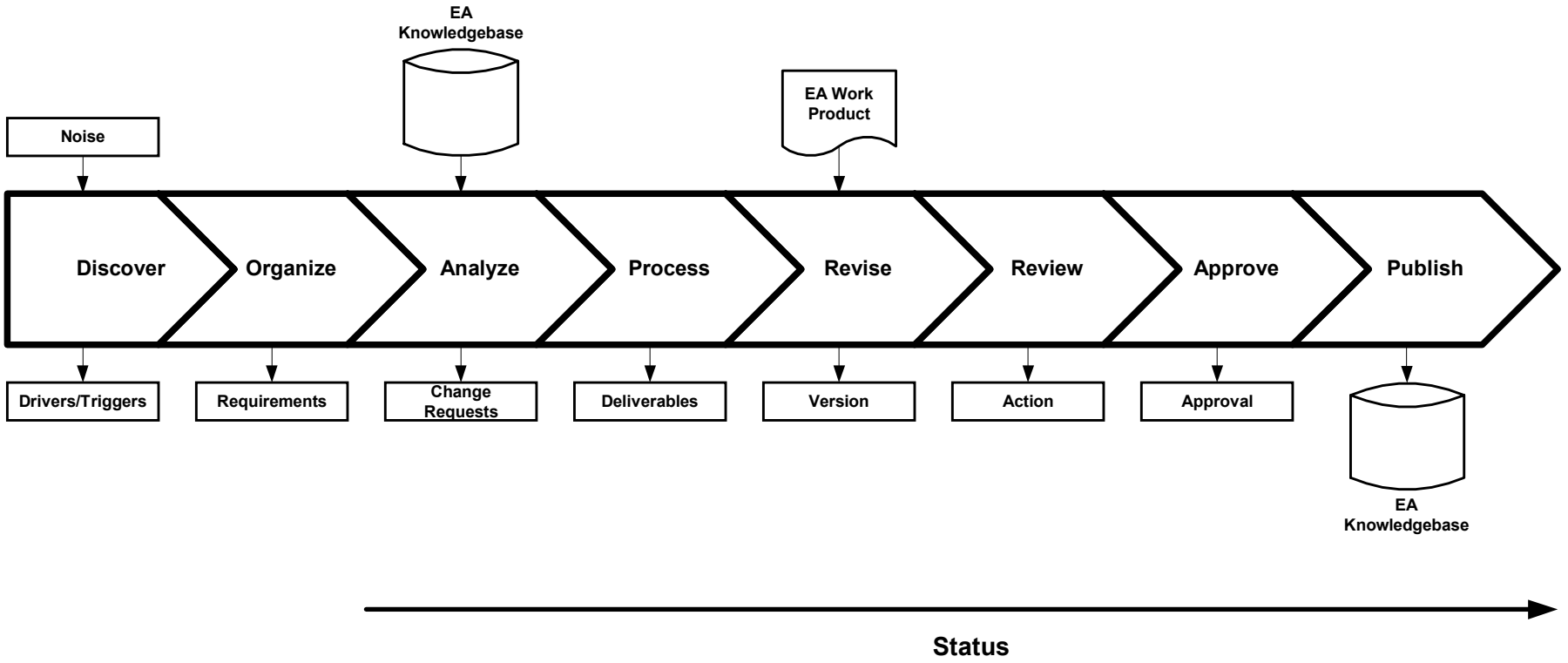
Information Value Chain (IVC)

The information value chain illustrates the logical sequence of events to transform data inputs and fulfill business information requirements. Each step in the IVC names the specific information management process and identifies relevant information inputs and outputs. Information outputs from a single step typically serve as an input to the next step in the sequence.

The following diagram illustrates the sequence of information management processes that are executed within the enterprise architecture phase to create and maintain EA work products. Individual steps in the IVC include processes to:

- Monitor the universe of inputs (noise) to HUD's EA practice to discover drivers and triggers for EA work product development and maintenance
- Organize strategic, business, and technology drivers to define requirements to update EA work products
- Analyze requirements to formulate change requests for individual work products
- Process change requests to create interim work products and revise EA work products
- Review and approve revised work products for publication in the EA knowledgebase.

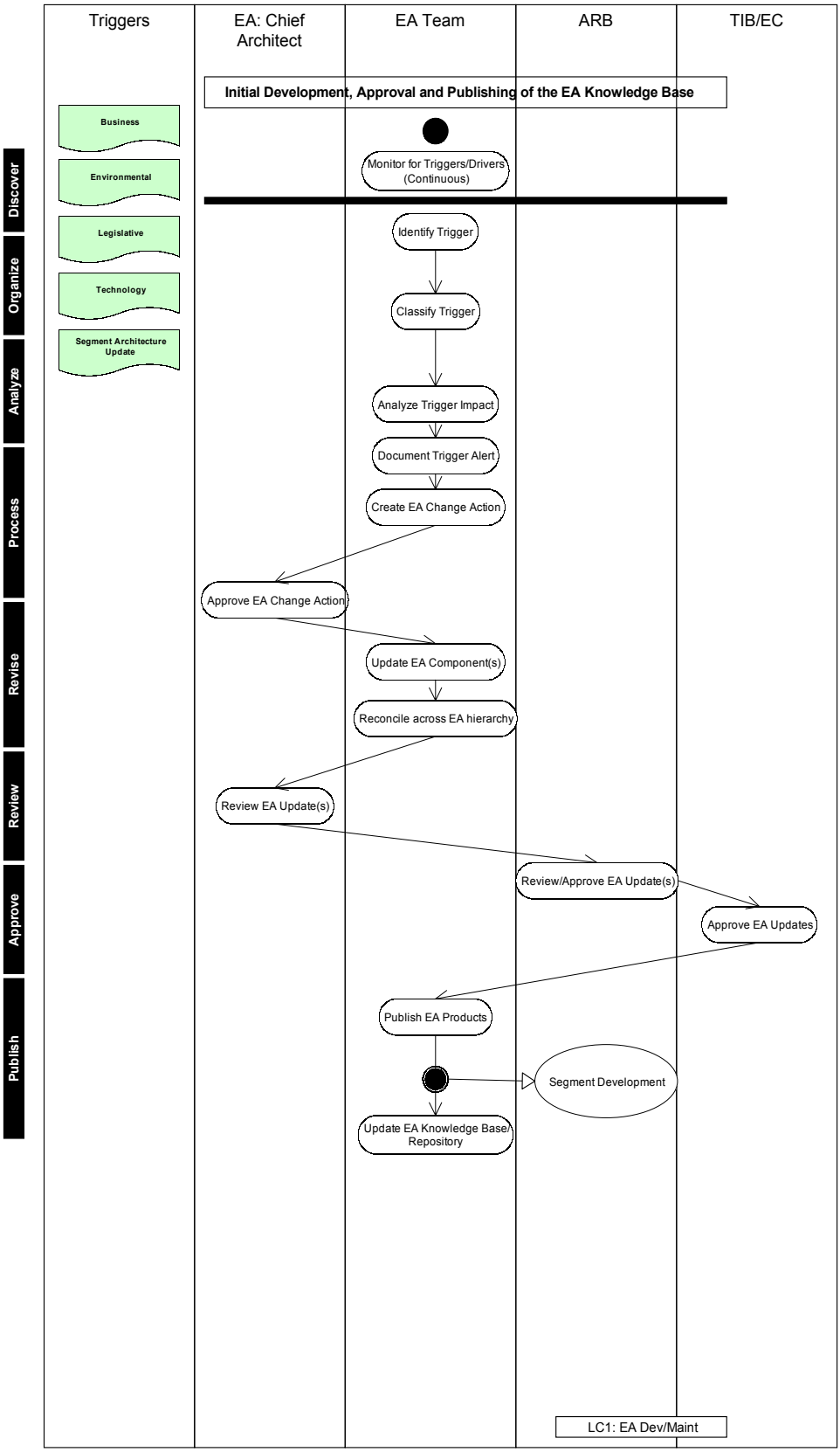
Information Value Chain: EA Information Management

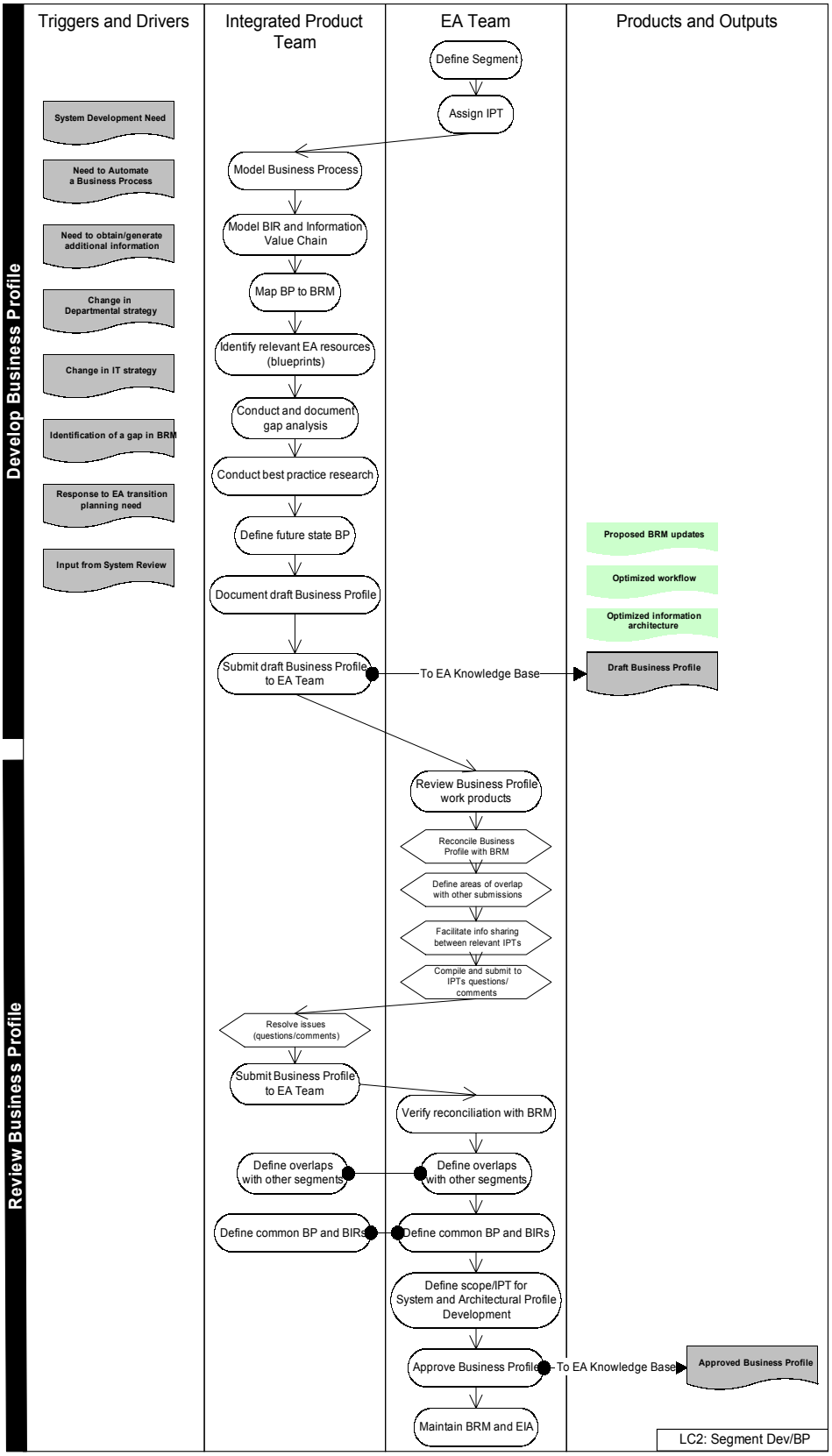


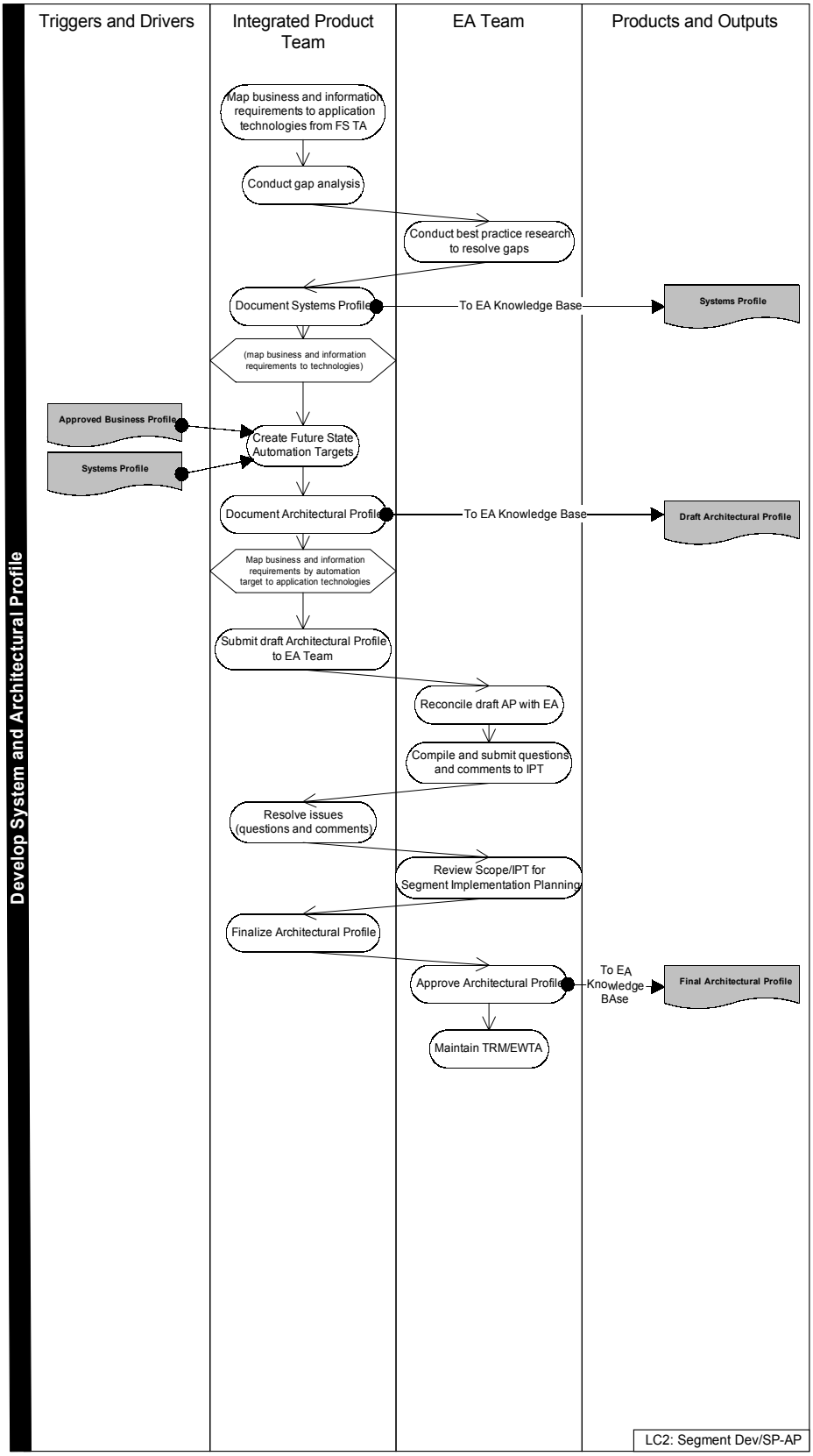
Activity Diagram

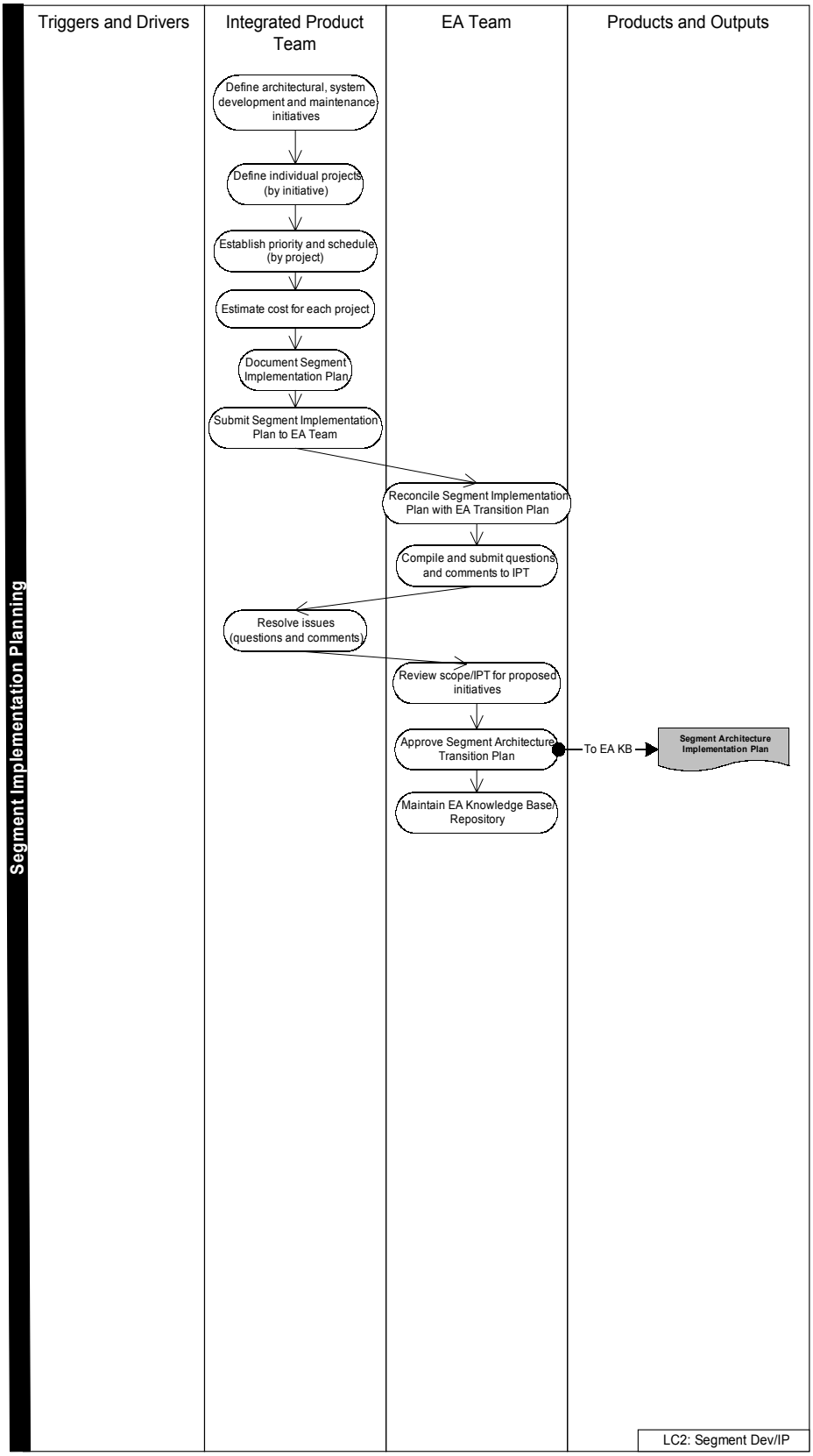
Activity diagrams document business process inputs, workflow, and products/outputs. Individual tasks and processes are typically organized into swim-lanes by major lifecycle participants.

The following diagrams provide a detailed description for both EA lifecycle activities and segment architecture activities. The EA activity diagram is mapped directly to the individual steps in the information value chain. The segment architecture lifecycle activity diagram is mapped to individual segment architecture work products: business profile, system profile, architectural profile, and implementation plan.


Triggers
EA: Chief Architect
EA Team
ARB
TIB/EC
Initial Development, Approval and Publishing of the EA Knowledge Base
Business
Environmental
Legislative
Technology
Segment Architecture Update
Discover
Organize
Analyze
Process
Revise
Review
Approve
Publish
Monitor for Triggers/Drivers (Continuous)
Identify Trigger
Classify Trigger
Analyze Trigger Impact
Document Trigger Alert
Create EA Change Action
Approve EA Change Action
Update EA Component(s)
Reconcile across EA hierarchy
Review EA Update(s)
Review/Approve EA Update(s)
Approve EA Updates
Publish EA Products
Segment Development
Update EA Knowledge Base/ Repository
LC1: EA Dev/Maint


Develop Business Profile
Review Business Profile
Triggers and Drivers
Integrated Product Team
EA Team
Products and Outputs
Define Segment
Assign IPT
System Development Need
Need to Automate a Business Process
Need to obtain/generate additional information
Change in Departmental strategy
Change in IT strategy
Identification of a gap in BRM
Response to EA transition planning need
Input from System Review
Model Business Process
Model BIR and Information Value Chain
Map BP to BRM
Identify relevant EA resources (blueprints)
Conduct and document gap analysis
Conduct best practice research
Define future state BP
Document draft Business Profile
Proposed BRM updates
Optimized workflow
Optimized information architecture
Submit draft Business Profile to EA Team
To EA Knowledge Base
Draft Business Profile
Review Business Profile work products
Reconcile Business Profile with BRM
Define areas of overlap with other submissions
Facilitate info sharing between relevant IPTs
Compile and submit to IPTs questions/ comments
Resolve issues (questions/comments)
Submit Business Profile to EA Team
Verify reconciliation with BRM
Define overlaps with other segments
Define overlaps with other segments
Define common BP and BIRs
Define common BP and BIRs
Define scope/IPT for System and Architectural Profile Development
Approve Business Profile
To EA Knowledge Base
Approved Business Profile
Maintain BRM and EIA
LC2: Segment Dev/BP


Develop System and Architectural Profile
Triggers and Drivers
Integrated Product Team
EA Team
Products and Outputs
Map business and information requirements to application technologies from FS TA
Conduct gap analysis
Conduct best practice research to resolve gaps
Document Systems Profile
To EA Knowledge Base
Systems Profile
(map business and information requirements to technologies)
Approved Business Profile
Systems Profile
Create Future State Automation Targets
Document Architectural Profile
To EA Knowledge Base
Draft Architectural Profile
Map business and information requirements by automation target to application technologies
Submit draft Architectural Profile to EA Team
Reconcile draft AP with EA
Compile and submit questions and comments to IPT
Resolve issues (questions and comments)
Review Scope/IPT for Segment Implementation Planning
Finalize Architectural Profile
Approve Architectural Profile
To EA Knowledge BAse
Final Architectural Profile
Maintain TRM/EWTA
LC2: Segment Dev/SP-AP


Segment Implementation Planning
Triggers and Drivers
Integrated Product Team
EA Team
Products and Outputs
Define architectural, system development and maintenance initiatives
Define individual projects (by initiative)
Establish priority and schedule (by project)
Estimate cost for each project
Document Segment Implementation Plan
Submit Segment Implementation Plan to EA Team
Reconcile Segment Implementation Plan with EA Transition Plan
Compile and submit questions and comments to IPT
Resolve issues (questions and comments)
Review scope/IPT for proposed initiatives
Approve Segment Architecture Transition Plan
To EA KB
Segment Architecture Implementation Plan
Maintain EA Knowledge Base/ Repository
LC2: Segment Dev/IP

Business Reference Model (BRM) Mapping

BRM Mapping links business process requirements to HUD's Business Reference Model (BRM) and the Federal BRM published by the Federal Enterprise Architecture Program Management Office (FEAPMO). This information is applied during the EA lifecycle phase to identify opportunities to reconcile business processes across lines of business.

The following tables map EA information management requirements to HUD's BRM and the Federal BRM. The current version of HUD's business reference model is a functional framework that classifies activities into a hierarchy of business functions, processes, and activities. The Federal BRM classifies activities into business areas, lines of business and sub-functions.

HUD's Business Reference Model

Business Function: Information Management	
Business Process	**Determine means to meet requirements**
Business Process	**Implement tools and guidance**
Business Process	**Manage data and information**
Business Process	**Manage corporate knowledge**

Federal Business Reference Model

Business Area: Support Delivery of Services	
Line of Business	**Planning and Resource Allocation**
Business Sub-Function	*Enterprise Architecture*
Business Function: Management of Government Resources	
Line of Business	**Information and Technology Management**
Business Sub-Function	*Lifecycle/Change Management*
Business Sub-Function	*Information Management*

Alternatives Analysis

Alternatives analysis summarizes the relative cost, benefit and associated risk (business and technical) of alternative approaches to fulfilling business and information requirements. Technical risk refers to the level of risk associated with the development and implementation of a specific technical solution. Business risk refers to the level of risk to the line of business or service when implementing a specific technical solution.

The following list summarizes alternative approaches to fulfilling EA information management requirements. The relative costs, benefits, and risks of each approach are described in the table below.

- **"Do Nothing"**: reflects HUD's existing EA practice relying on manual information management processes for the creation and maintenance of EA work products. EA-related work products and information are stored and retrieved using the existing Enterprise Architecture Management System (EAMS).
- **Custom Development**: a fully custom-developed system featuring proprietary functional components, business rule execution, and interface handling. A relational database management system (RDBMS) is custom designed as a data management layer for information, content and knowledge management.
- **Component Integration**: the integration of commercially available functional components, standard Java libraries, and interface handling routines. This approach uses fully supported COTS software for automating standard work functions including: search and discovery; workflow automation; status tracking; modeling; and content, knowledge and database management. Each component is compliant with HUD's future state technical architecture and is fully integrated within a COTS portal shell.

Alternative	Cost	Benefit	Technical Risk	Business Risk
1. "Do Nothing"	Very Low	Very Low	Very Low	Very High
2. Custom Development	Very High	Medium	High	Medium High
3. Component Integration	Medium	High	Medium	Medium Low

Analysis of the relative cost, benefits, and risk of alternative approaches reveals that the component integration approach offers the most favorable implementation strategy. This approach fulfills EA information management requirements through the implementation of mature, commercially-available products resulting in moderate

development costs compared to a custom development solution. In addition, the custom integration approach is not dependent upon the technical capabilities of a single development team to develop, implement and support a proprietary solution and, consequently, carries the lowest level of technical and business-related risk.

The "Do Nothing" approach does not fully meet EA information management requirements and carries the highest level of business risk.

3.0 System Profile

The System Profile maps business and information requirements to a future state technical architecture.

EA information management requirements are mapped to the Federal Service Component Reference Model (SRM) as defined by the Federal Enterprise Architecture Program Management Office (FEAPMO). The Federal SRM is a functional framework that classifies service delivery components into a hierarchy of service domains, types, and components. The SRM reflects vertical and cross-cutting services and provides a leverage-able foundation to define opportunities for the re-use of applications, application capabilities, components, and work processes.

This functional view provides a logical connection between business and information requirements and technical infrastructure requirements.

Service Domain: Customer Services	
Service Type	**Customer Relationship Management**
Service Component	*Sales and Marketing*
Service Component	*Product Management*
Service Component	*Customer Feedback*
Service Type	**Customer Preferences**
Service Component	*Subscriptions*
Service Component	*Alerts and Notifications*
Service Component	*Profile Management*

Service Domain: Process Automation Services	
Service Type	**Tracking and Workflow**
Service Component	*Process Tracking*
Service Component	*Case/Issue Management*
Service Domain: Business Management	
Service Type	**Management of Process**
Service Component	*Change Management*
Service Component	*Requirements Management*
Service Component	*Program/Project Management*
Service Domain: Digital Asset Services	
Service Type	**Content Management**
Service Type	**Document Management**
Service Type	**Knowledge Management**
Service Domain: Business Analysis Services	
Service Type	**Analysis and Statistics**
Service Component	*Structural/Thermal (Modeling)*
Service Type	**Visualization**
Service Component	*Graphing and Charting*
Service Type	**Reporting**
Service Component	*Ad-hoc*
Service Component	*Standardized*

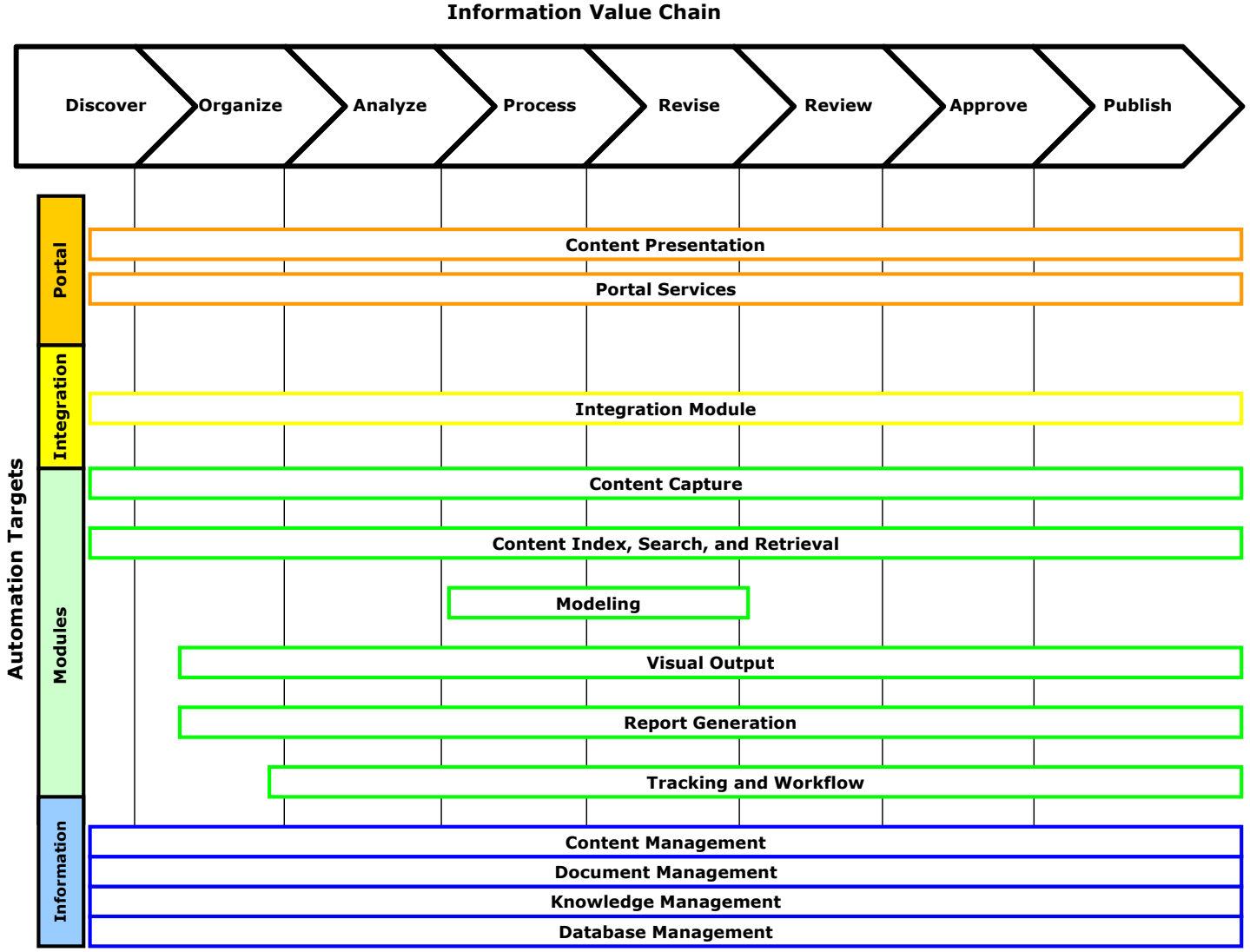
Service Domain: Back Office	
Service Type	**Data Management**
Service Domain: Support Services	
Service Type	**Security Management**
Service Type	**Collaboration**
Service Type	**Search**

4.0 Architectural Profile

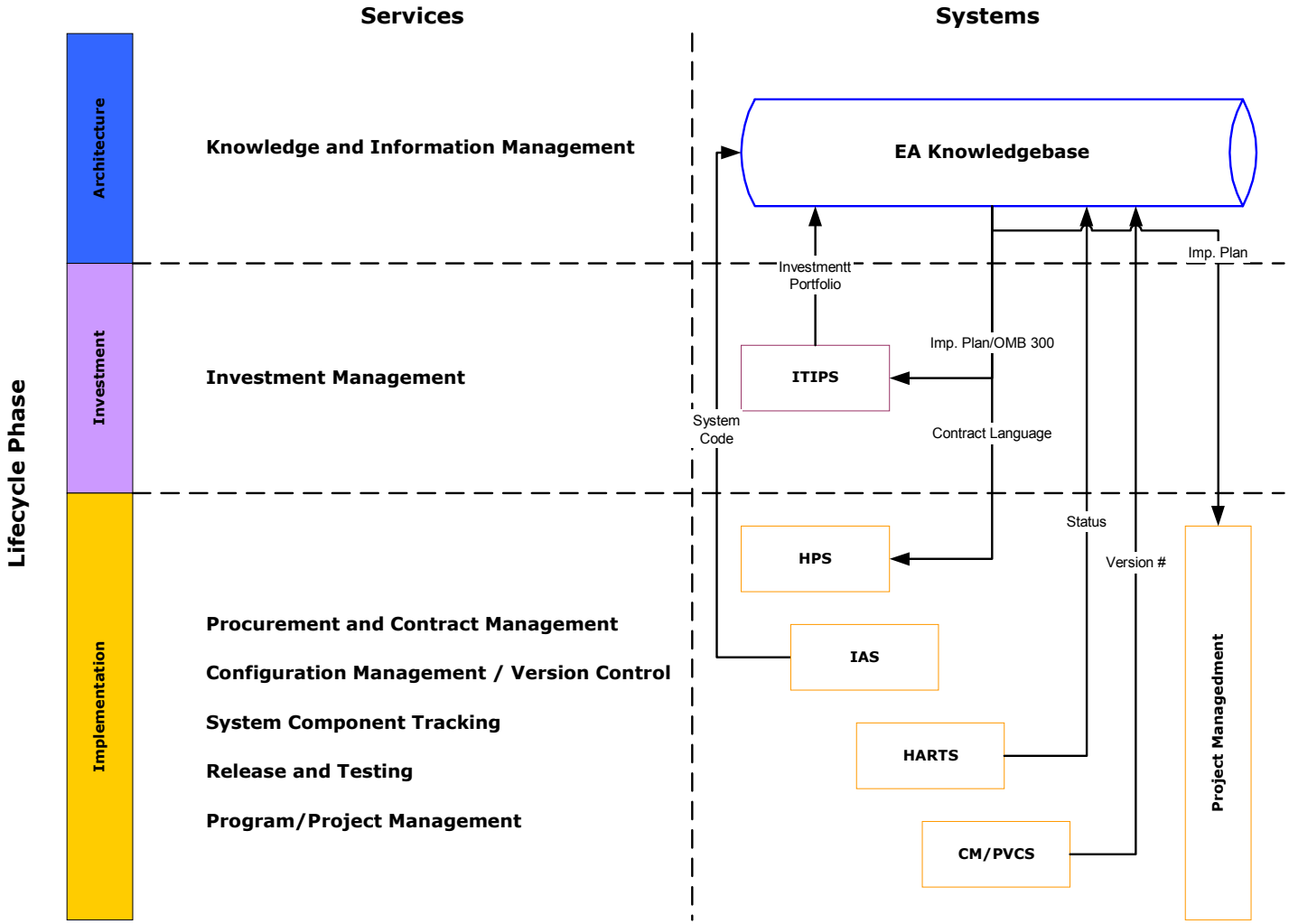
The Architectural Profile defines functional automation targets and system integration targets to fulfill business and information requirements. Automation targets represent individual systems or system modules that support specific functional or integration requirements. Integration targets represent interfaces between one or more automation targets.

The following diagrams map EA information management automation to steps in the information value chain, and illustrate system integration targets. Automation targets are classified based upon the module type, i.e., portal, integration, application module, and information management. System integration targets are classified by the three phases of the IT lifecycle: architecture, investment, and implementation.

Architectural Profile: EA Information Management Automation Targets



Architectural Profile: EA Information Management System Interfaces



5.0 Implementation Plan

Performance Goals and Measures

HUD's EA practice is closely aligned with OMB's Federal Enterprise Architecture initiative and e-gov implementation strategy. The EA practice seeks to expand the role of electronic government and to improve enterprise-wide management and performance. These goals relate directly to the Presidential Management Agenda Goal #4: Expanded Electronic Government and to the HUD-specific Goal #10: Management and Performance - Strengthen Program Controls.

EA information management seeks to improve the quality and accessibility of EA work products and information sources to support all phases of HUD's enhanced IT lifecycle. Implementation of EA information management processes, tools and guidelines will fulfill the following performance goals:

- 100% of updates to EA work products and information sources are traceable to business and information requirements
- 100% of EA work product updates follow a managed lifecycle
- 100% of EA work products and information sources are created and maintained electronically

Implementation Strategy

HUD's EA practice represents a single ITIM initiative that is comprised of multiple projects to develop, maintain, and implement HUD's enterprise architecture. In addition, HUD's EA practice develops tools to provide enterprise-wide access to EA work products and information sources, and conducts end-user training and outreach to promote HUD's EA practice as an integrated component of the enhanced IT lifecycle. The EA information management implementation strategy is closely aligned with the development and implementation of the proposed automation and integration targets, and seeks to leverage existing EA practice activities, tools, and resources to accelerate implementation and to demonstrate enterprise-wide benefits.

HUD's EA Team is scheduled to develop and publish target enterprise architecture prior to the FY2004 Annual Select. Target enterprise architecture will populate the EA knowledgebase and provide valuable information to all phases of the enhanced IT lifecycle. HUD's existing Enterprise Architecture Management System (EAMS) will be used to provide convenient end-user access to EA work products and information source during the initial implementation period (year 1), and to support basic requirements for database management; index, search, and retrieval; reporting; and, portal operations. Implementation tasks will be executed to design, develop and implement additional capabilities to support the complete set of EA information management requirements during the initial rollout period and throughout subsequent years.

The following table outlines the proposed automation target implementation schedule.

	Automation/Integration Targets	
Year 1	Data Management	**Integration**
	Portal	
	Index, Search and Retrieve	
	Reporting	
Year 2	Content Capture	
	Modeling	
	Visual Output	
Year 3	Tracking and Workflow	
	Integration Targets	

The following table summarizes EA information management implementation milestones for FY2004. This initial strategy leverages planned/existing resources to develop target enterprise architecture and to develop the next generation Enterprise Architecture Management System (EAMS).

Implementation Milestone (FY 2004)	Complete
Assign Program Manager	Q1
Publish Target EA (EAMS)	Q2
Revise EA Communication Strategy	Q2
Update EA Information Management Segment Architecture	Q2
Release next generation EAMS	Q3
Define workflow process and procedures for individual EA products	Q3
Update EA Policy/EA Framework	Q3
Complete design specification for EA information management FY2005 roll-out	Q4